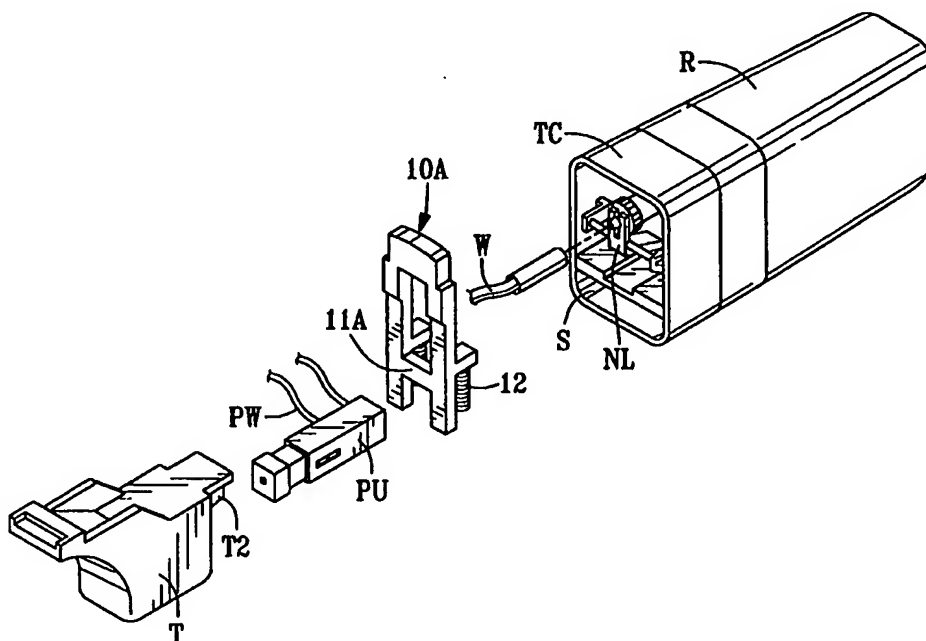




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(54) Title: **MULTI-PURPOSE GAS LIGHTER WITH IGNITION-RESISTANT FUNCTION**



(57) Abstract

A child resistant utility lighter as shown in figures 1 through 5, having a conventional utility lighter construction, the improvement comprising a protruded lever (T1, T2), a U-shaped ignition resistant button (10), a stopper (11, 11A), and a spring (12). The stopper (11, 11A) and protruded lever (T1, T2) are aligned parallel with each other preventing the production of a spark and the release of fuel unless the ignition resistant button (10) is simultaneously depressed. After use of the utility lighter, the spring (12) urges the ignition resistant button (10) upward, automatically restoring the ignition function.

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DESCRIPTION

5 Multi-Purpose Gas Lighter with Ignition-Resistant Function

10 Inventor: Jon, Jong-Koo

15 1. TECHNICAL FIELD:

This invention relates to child-resistant utility lighters.

20 2. BACKGROUND ART:

Utility lighters are very useful and have become quite prevalent in modern society. Utility lighters of the type described herein generally contain a handle and an elongated nozzle pipe. The shape and operation of utility lighters allow for several advantages over normal means of producing a flame. Most significantly, due to the elongated nature of the nozzle pipe, utility lighters enable the operator to stand a safe distance away from the object to be ignited before actuating the lighter, thus avoiding a large number of potential accidents. In addition, utility lighters allow a flame to be produced in hard-to-reach or narrow places, where the human hand holding a match would not normally fit. Still, in the hands of children, or others who do not know how to safely and properly operate the lighter, such lighters are as dangerous as any other spark and/or flame-producing device. Therefore, a need has been realized to equip utility lighters with safety features that minimize

accidental or improper use by inexperienced persons,
especially young children.

5

Many inventions have been created to address this
10 safety-related concern. Generally, these inventions have
sought to introduce safety mechanisms that disable
automatic operation of either the spark-generation and/or
15 the fuel-release function of the lighter. For example,
some utility lighters provide for a blocking mechanism,
20 where the actuating trigger is blocked from moving the
required distance for a spark to be generated. As
depicted in Figure 6, the locking mechanism is normally
25 de-activated by sliding an "on/off" switch to the "on"
position, or by other means, so as to remove the
30 impediment from the actuating trigger's operating path.

Although utility lighters of the type described above
35 provide some level of safety, there is much room for
improvement. Specifically, in these lighters, once the
40 "on/off" switch is disabled, the lighter remains in the
unlocked state until the locking mechanism is activated
again. Therefore, if the operator disables the locking
45 mechanism in order to use the lighter, and then forgets to
re-lock the lighter, the safety feature of the lighter is
50 rendered useless, until the locking mechanism is again
activated.

Other inventions have attempted to address the safety-

related issues by impeding not the operation of the trigger, but that of the fuel-release mechanism. Of course, a utility lighter containing such a mechanism would inhibit flame generation in the locked position as no fuel would be released until the locking mechanism has been deactivated. However, in these types of lighters, nothing prevents a spark from being generated. As such, the safety goals are only partially met in these types of lighters since young children handling the lighter could still create fires by operating the lighter in close proximity to a source of fuel or near carpets, paper, or other flammable material. In addition, the same disadvantages that were discussed above with respect to trigger-locking mechanisms apply equally well to fuel-release disabling mechanisms.

Therefore, there is a need for a device that not only achieves the stated safety goals, but also is amenable to operation with relative ease. The invention described herein offers such a combination. The invention requires that an ignition resistant button, located on the exterior surface of the handle be depressed simultaneously with the trigger before a flame can be produced. In this way, young children are coaxed into believing that they can operate the lighter in the usual way, i.e., by pressing the trigger. However, such operation will produce neither a spark nor a flame. Moreover, given the position of the ignition resistant button relative to the trigger, the

5 simultaneous operation of both the trigger and the
ignition resistant button can be performed by one hand of
the intended adult user for ease of operation. However,
the smaller size of a child's hand makes it difficult for
10 a child to engage both the ignition resistant button and
the trigger simultaneously with just one hand. Further,
after each use, the ignition resistant mechanism
15 automatically engages, eliminating the need to remember to
re-lock the lighter.

20

3. DISCLOSURE OF INVENTION:

25 The primary object of this invention is to provide an
automatic safety mechanism for utility lighters so that
children or inexperienced users will be less likely to
30 inadvertently activate the lighter. Such a safety feature
is especially important because young children often play
with lighters as toys and because lighters have
35 mechanically moveable parts that make them attractive to
children as toys. Further, the automatic safety
40 mechanism relieves the user of the burden of having to
remember to activate the safety mechanism after each use.

45

Another object of the present invention is to prevent
the generation of not only a flame, but even a spark. As
50 noted previously, in a lighter where only the fuel-release
mechanism is inhibited in the locked state, young children
playing with the lighter can still use the lighter to
create sparks. Depending on the child's surroundings,

5 this can lead to the start of accidental fires if the child is operating the lighter near paper products or any other source of flammable material.

10 A further object of the invention described herein is to provide an improved device for maximizing safety in utility lighters without compromising ease of use. To
15 this end, the invention permits the intended adult user to operate the utility lighter with only one hand.

20 The invention meets its objectives by providing an ignition resistant button that must be depressed
25 simultaneously with the trigger to produce a spark and a flame. The ignition resistant button is positioned on the exterior surface of the handle at a location behind the
30 trigger. Typically, a young child will attempt to activate the lighter by depressing only the trigger.
35 However, when this is done, neither a spark nor a flame will be generated as the trigger is stopped along its path by a stopper before the spark-producing mechanism can be
40 activated. In addition, the placement of the ignition resistant button permits the intended adult user to use
45 only one hand when operating the lighter, however, it is difficult for a child with smaller hands than an adult to
50 depress both the ignition resistant button and the trigger with one hand.

The only way to activate the lighter is to depress the

5 ignition resistant button simultaneously with sliding the
trigger towards the back and activating the spark-
producing mechanism. This is a simple, yet effective
concept. Nevertheless, it is a concept that a young child
10 operating the lighter must recognize and grasp before
he/she can successfully operate the lighter. In most
cases, the child will not recognize the usefulness of the
15 ignition resistant button and will abandon the lighter
after several unsuccessful attempts. Further, when the
20 ignition resistant button and trigger are released, the
safety mechanism automatically engages eliminating the
need to remember to re-lock the lighter.

25

Moreover, even if a child does attain an appreciation
30 for the interrelationship between the ignition resistant
button and the production of a flame, he/she will still
have difficulty activating the lighter. The portion of
35 the ignition resistant button that is exposed is located
on exterior surface of the lighter housing at a position
40 behind the trigger. As such, the smaller size of a
child's hand does not permit a child to depress the
ignition resistant button and the trigger simultaneously.

45

Finally, as can be understood from the above
50 description, the invention disclosed herein achieves its
safety objectives without making operation of the lighter
any more cumbersome than a regular utility lighter with no
safety feature. Specifically, the ignition trigger is

shaped and positioned in such a way that operation of the lighter is very simple in experienced hands. An adult user familiar with the operation of utility lighters need use only hand to activate the lighter as he/she would depress the ignition resistant button with his/her thumb while simultaneously depressing the trigger with his/her finger. This allows the user to operate the lighter in a safe, yet non-complicated manner.

This and other advantages of the present invention will become more apparent through the following description of the drawings and detailed description of the preferred embodiment.

4. BRIEF DESCRIPTION OF THE DRAWINGS:

Figure 1 is a perspective view of a lighter of a first embodiment of the present invention,

Figure 2 is a perspective view of a lighter of a first embodiment of the present invention, showing a condition wherein one shell is separated from the other shell exposing the internal structure of the lighter,

Figure 3 is a perspective view of a lighter of a first embodiment of the present invention, showing a condition wherein the trigger and ignition resistance button is separated from the main housing,

Figure 4a is a vertically cross-sectional view of the lighter of the first embodiment,

Figure 4b is a vertically cross-sectional view of

the lighter of the first embodiment of the present invention while in use,

5 **Figure 5** is a perspective view of a lighter of a second embodiment of the present invention, showing a condition wherein the trigger and ignition resistance
10 button is separated from the main housing,

15 **Figure 6** is a perspective view of a prior art lighter with an "on/off" switch.

20 5. BEST MODE FOR CARRYING OUT THE INVENTION AND INDUSTRIAL APPLICABILITY:

25 Figures 1 through 4(b) generally illustrate the best mode of the present invention, a multi-purpose gas lighter with ignition resistant function. The lighter is
30 constructed of a handle (H), a nozzle pipe (NP) attached to the forward end of the handle (H) via engagement means, a actuating trigger (T), a piezoelectric unit (PU), a
35 nozzle lever (NL) that translates the motion of the trigger (T) to open a nozzle (N), and a fuel reservoir (R).

45 The handle (H) is comprised of two shells (C), cut along the longitudinal axis of the lighter, having an exterior surface and an internal cavity. Fig. 2 shows one
50 of these shells (C) separated from the other shell and exposing the internal structure of the lighter. The cavity houses the internal components of the lighter,

including a fuel reservoir (R), a nozzle (N), a nozzle lever (NL), and a piezoelectric unit (PU).

5

The lighter is equipped with a fuel reservoir (R),
10 having a forward end and a rear end, located near the back
end of the handle (H). A fuel-release nozzle (N) is
attached to the forward end of the fuel reservoir (R) and
15 controls the emission of fuel. This nozzle (N) is spring
loaded so that it is normally urged to a closed position.
20 A fuel tube (W) is connected to the nozzle (N) and extends
the length of the nozzle pipe (NP) to a discharge nozzle
(not shown) at the free end of the nozzle pipe. A nozzle
25 lever (NL) engages the nozzle (N) and translates the
motion of the trigger to open the nozzle (N) and release
30 fuel.

A trigger (T), having an interior portion and
35 operational portion, is slidably mounted between the two
shells of the handle (H) and is allowed to slide back and
40 forth along the longitudinal axis of the lighter. The
interior portion has means for engaging the nozzle lever
(NL) and is also fixedly attached to a piezoelectric unit
45 (PU) which creates an electric discharge that is carried
to the free end of the nozzle pipe (NP) via a wire (PW) to
50 ignite the released fuel. A protruded lever (T1) is
formed on the interior portion in a parallel direction
with the trigger (T). The operational portion is opposite
the interior portion and exposed to the user.

5 The new and novel improvement of the present invention
includes the addition of an ignition resistant function.
One of the primary elements of the ignition resistant
10 function is a U-shaped ignition resistant button (10).
The ignition resistant button (10) has a finger pad and at
least two supporting legs. The finger pad is exposed on
15 the exterior surface of the handle (H) from an air hole
(C1) located at a position behind the trigger (T). The
20 supporting legs are contained within the internal cavity
of the handle (H) and flare outward to create ledges that
prevent the ignition resistant button (10) from falling
25 out of the air hole (C1). Springs (12) are attached to
the supporting legs urging the ignition resistant button
30 (10) upward towards an "off" position. A stopper (11) is
attached to at least one supporting leg and is positioned
parallel to the protruded lever (T1).

35

As shown in Figure 4a, when the lighter is not in use,
40 the protruded lever (T1) is parallel and aligned with the
stopper (11). In this position, if a user depresses the
trigger (T) without depressing the ignition resistant
45 button (10), the protruded lever (T1) abuts the stopper
(11) preventing the activation of the piezoelectric unit
50 (PU) and the nozzle lever (NL). However, during operation
(as shown in Figure 4b), the ignition resistant button
(10) is depressed moving the stopper (11) downward and
away from the protruded lever (T1). At this position,

when the trigger is depressed, the protruded lever (T1) does not abut the stopper (11) and the trigger (T) 5 activates the piezoelectric unit (PU) and engages the nozzle lever (NL) to open the nozzle (N) and release fuel. 10 When the trigger (T) and ignition resistant button (10) is released after use, the springs (12) urge the ignition resistant button (10) upward such that the stopper (11) is 15 re-aligned with the protruded lever (T1).

20 In another embodiment, the position of the stopper (11A) and the protruded lever (T2) are slightly modified. As shown in Figure 5, the stopper (11A) is positioned 25 between the supporting legs of the ignition resistant button (10) and is parallel to the protruded lever (T2). 30 The protruded lever (T2) is located at the rear of the internal portion of the trigger (T) and extends parallel towards the stopper (11A). During operation, the ignition 35 resistant button (10) is depressed, moving the stopper (11A) downward and away from the path of the protruded lever (T2) thereby permitting the trigger (T) to activate the piezoelectric unit (PU) and engage the nozzle lever (NL) 40 45

Unless a young child appreciates the need to depress 50 the ignition resistant button simultaneously with the trigger, the child will not be able to ignite the lighter. Therefore, this invention adds additional analytical steps to the process of understanding the operation of the

lighter which impedes the ability of small children to use
the lighter. In addition, although the position of the
5 ignition resistant button relative to the trigger is
comfortably positioned for use by the intended adult user,
10 a child with smaller hands will not be able to depress the
ignition resistant button and the trigger with one hand.

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What is claimed is:

1. An ignition resistance mechanism in a utility lighter
5 comprised of a handle (H) having a back end and a forward end, a nozzle pipe (NP) with an engagement end and a free end, the engagement end being attached to the forward end
10 of the handle (H) and the free end constituting the tip of the lighter, and the handle (H) being provided with:
 - 15 A. a fuel reservoir (R) having a forward end and a rear end,
 - 20 B. a fuel nozzle (N) attached to the forward end of said fuel reservoir (R) and having a closed position and an open position for controlling the discharge of fuel
25 into the fuel pipe (W), said fuel pipe (W) extending from said fuel nozzle (N) to the free end of the nozzle pipe
30 (NP),
 - 35 C. a fuel release nozzle lever (NL) for translating the movement of the trigger (T) and engaging said fuel nozzle (N) from the closed position and an open position, the fuel-release nozzle lever (NL) being spring loaded to
40 urge said fuel nozzle (N) to the closed position,
 - 45 D. a piezoelectric unit (PU), for generating a discharge voltage that is carried by a wire (PW) to the free end of the nozzle pipe (NP) to ignite the fuel,
 - 50 E. a trigger (T) slidably mounted on said handle (H) and having an internal portion and an operational portion, with the internal portion attached to said piezoelectric unit (PU) and said operational portion exposed from the handle (H) to the user,

wherein the improvement comprises:

5 F. a protruded lever (T1) fixed to said internal portion of the trigger (T) and extending horizontally towards the back end of the handle (H);

10 G. a U-shaped ignition resistant button (10) having a finger pad and at least two supporting legs, said finger pad protruding out of a formed air hole (C1) on the surface of the handle, and said supporting legs having a ledge formed immediately beneath the surface of the handle
15 to prevent said ignition resistant button (10) from falling out of the handle (H),

20 H. a stopper (11) attached to at least one supporting leg and extending parallel towards said protruded lever,

30 I. return springs (12) fixed to said supporting legs, said springs (12) urging the ignition resistance button (10) upward.
35

2. An ignition resistance mechanism in a utility lighter
40 as in claim 1, wherein the stopper (11A) is positioned between the supporting legs of the ignition resistant button (10) and the protruded lever (T2) is positioned at
45 the rear of the internal portion of the trigger (T) and extends parallel towards the stopper (11A).

50

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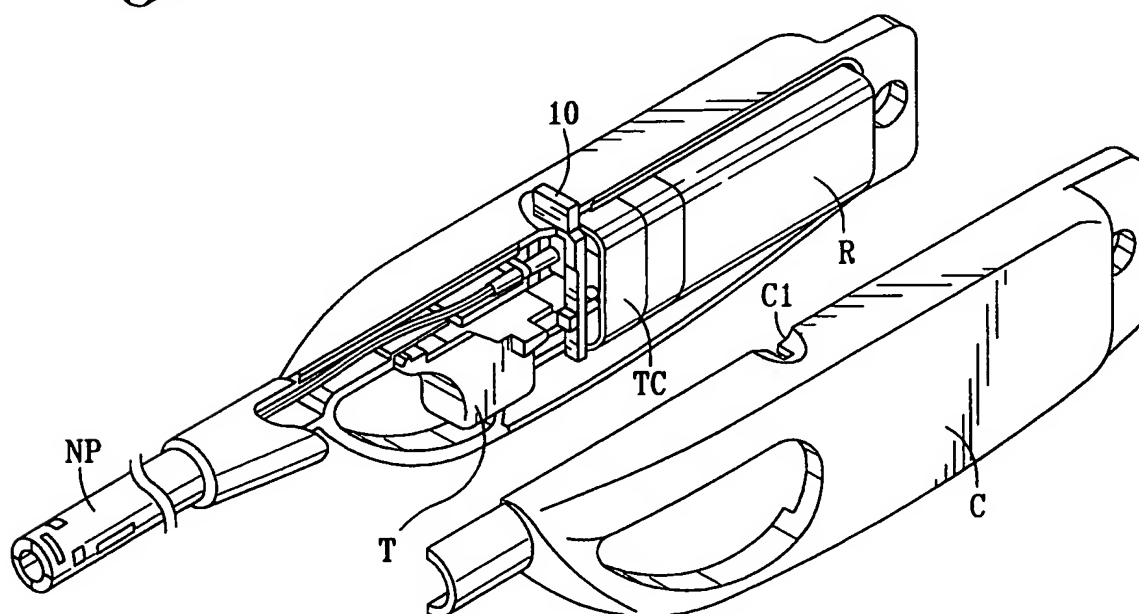
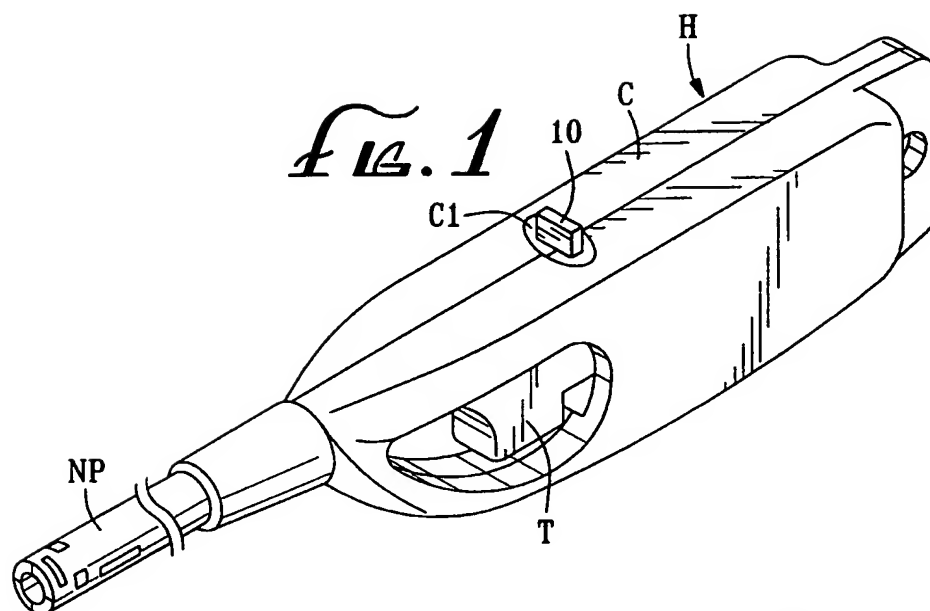


Fig. 2

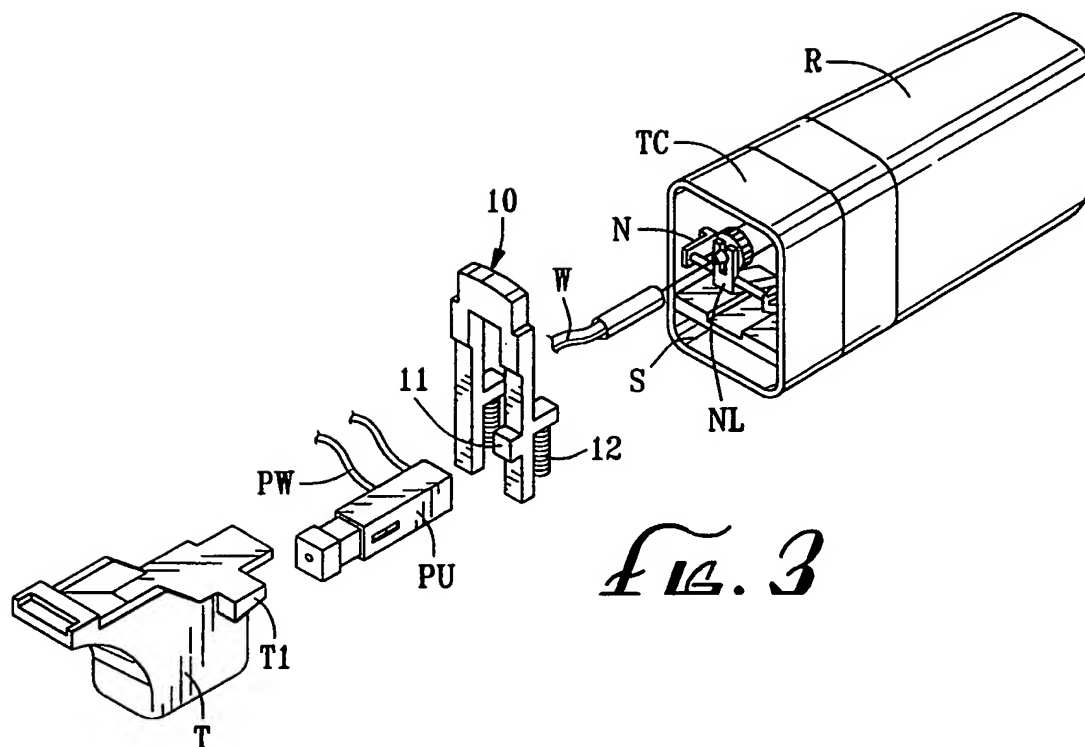
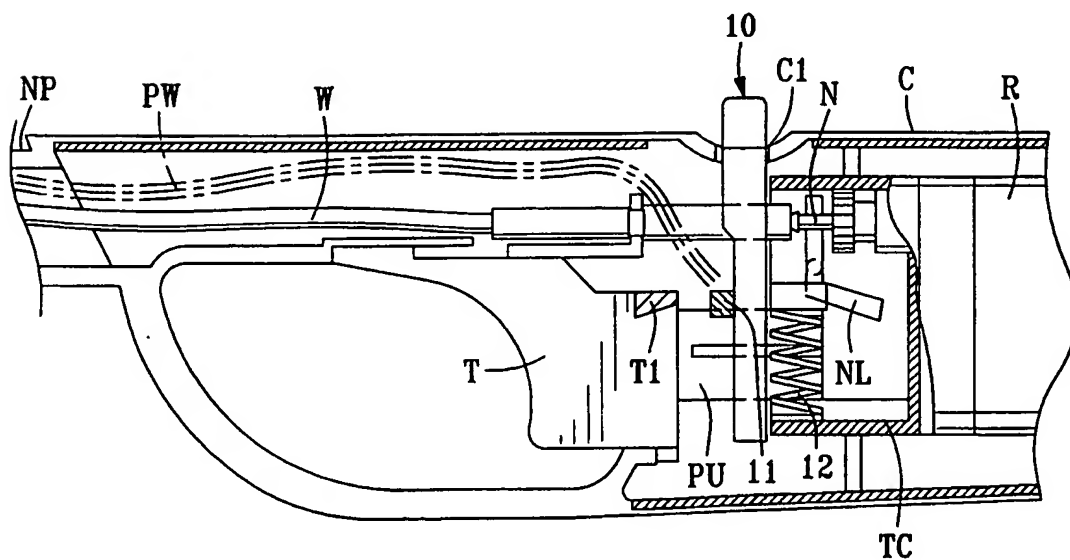

$$f_{LG.3}$$


Fig. 4A

3/4

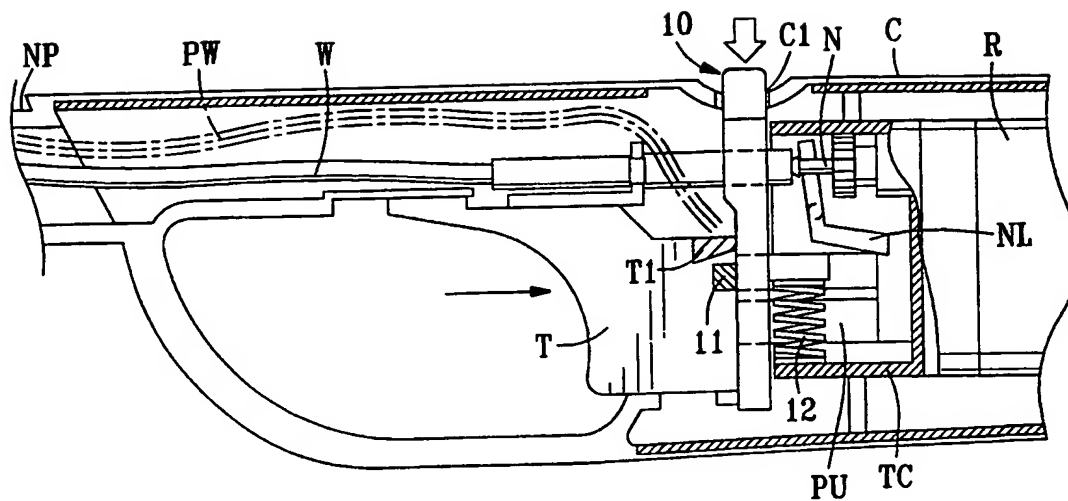


Fig. 4B

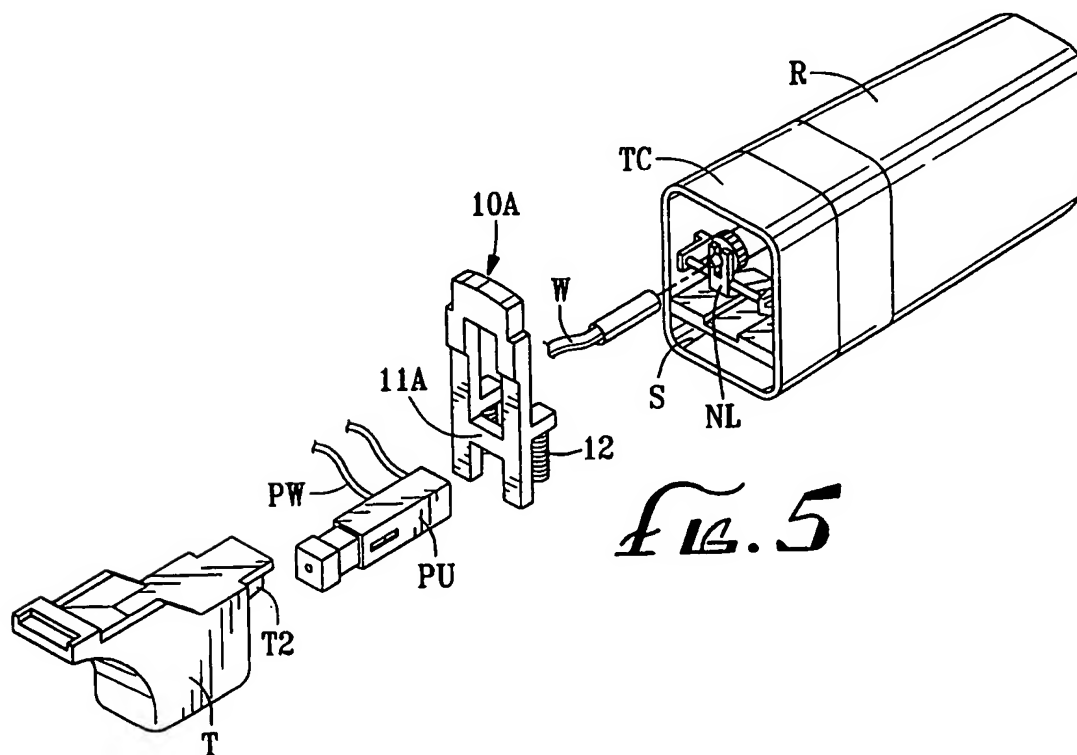
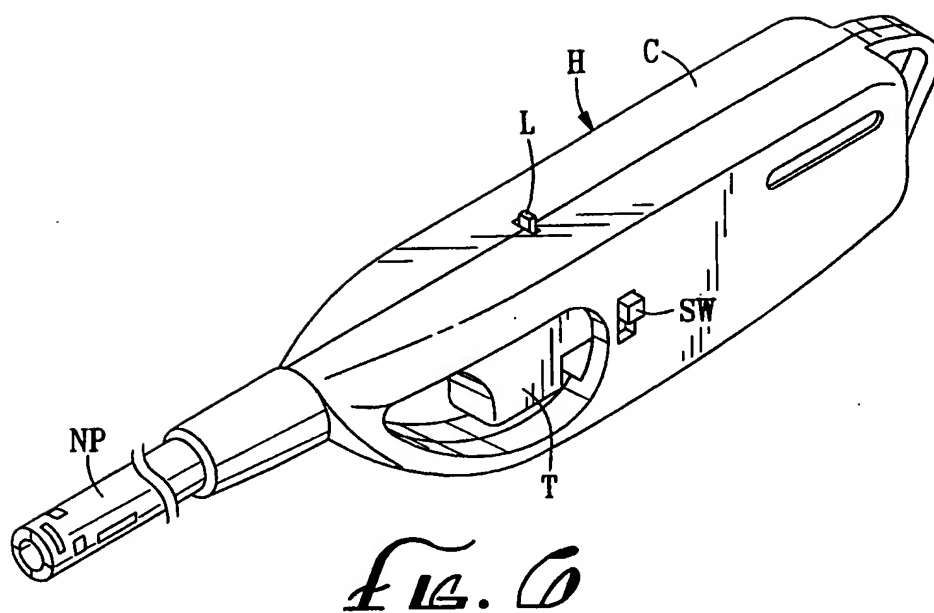


Fig. 5

4/4



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US99/05826

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : F23D 11/36

US CL : 431/153,255,266,344,345; 126/25B

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 431/153,255,266,344,345; 126/25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

NONE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X | US 5,697,775 A (SAITO ET AL) 16 December 1997, see figures 4A and 4B; elements 20,20C,26,27,27B,28. | 1-2 |
| A | US 5,496,169 A (CHEN) 05 March 1996, see the entire document. | 1-2 |
| A | US 5,451,159 A (KIM) 19 September 1995, see the entire document. | 1-2 |



Further documents are listed in the continuation of Box C.



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